

**HEALTH ADVISORY AND
SAFE EATING GUIDELINES
FOR FISH FROM
FOLSOM LAKE AND
LAKE NATOMA
(SACRAMENTO, EL DORADO
AND PLACER COUNTIES)**

October 2008

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EXECUTIVE SUMMARY

Mercury levels were evaluated in edible tissues of fish caught from Folsom Lake in Sacramento, El Dorado and Placer counties, an area possibly affected by historic gold mining. Mercury levels in fish were collected and analyzed by the U.S. Geological Survey for the U.S. Bureau of Reclamation. The contaminant data were evaluated by the Office of Environmental Health Hazard Assessment (OEHHA) to determine whether there may be potential adverse health effects associated with the consumption of certain sport fish from this water body and to identify fish species with low contaminant levels considered safe to eat frequently. Based on this evaluation, a health advisory and safe eating guidelines were developed that allow fishers to select fish to eat from Folsom Lake in quantities that maintain mercury exposures within safe levels while supporting the health benefits of fish consumption. Additionally, a previous state advisory for Lake Natoma in Sacramento County was revised using the newly developed advisory tissue levels (ATLs) for mercury and other contaminants. Lake Natoma is a 500-acre afterbay for Folsom Lake Dam. With the exception of catfish, mercury contaminant data for the two connected water bodies were similar; therefore, unified fish consumption guidelines for Folsom Lake and Lake Natoma were deemed justified.

Mercury contamination of fish is a national problem that has resulted in the issuance of fish consumption advisories in most states, including California. Mercury is a trace metal that can be toxic to humans and other organisms in sufficiently high doses. Mercury occurs naturally in the environment and is also redistributed as a result of human activities such as mining and the burning of fossil fuels. Once mercury is released into the environment, it cycles through land, air, and water. In aquatic systems, it undergoes chemical transformation to the more toxic organic form, methylmercury, which accumulates in fish and other organisms. Almost all fish contain detectable levels of mercury, more than 95 percent of which occurs as methylmercury. Consumption of fish is the major route of exposure to methylmercury in the United States. For more information on mercury in fish, see Appendix 1.

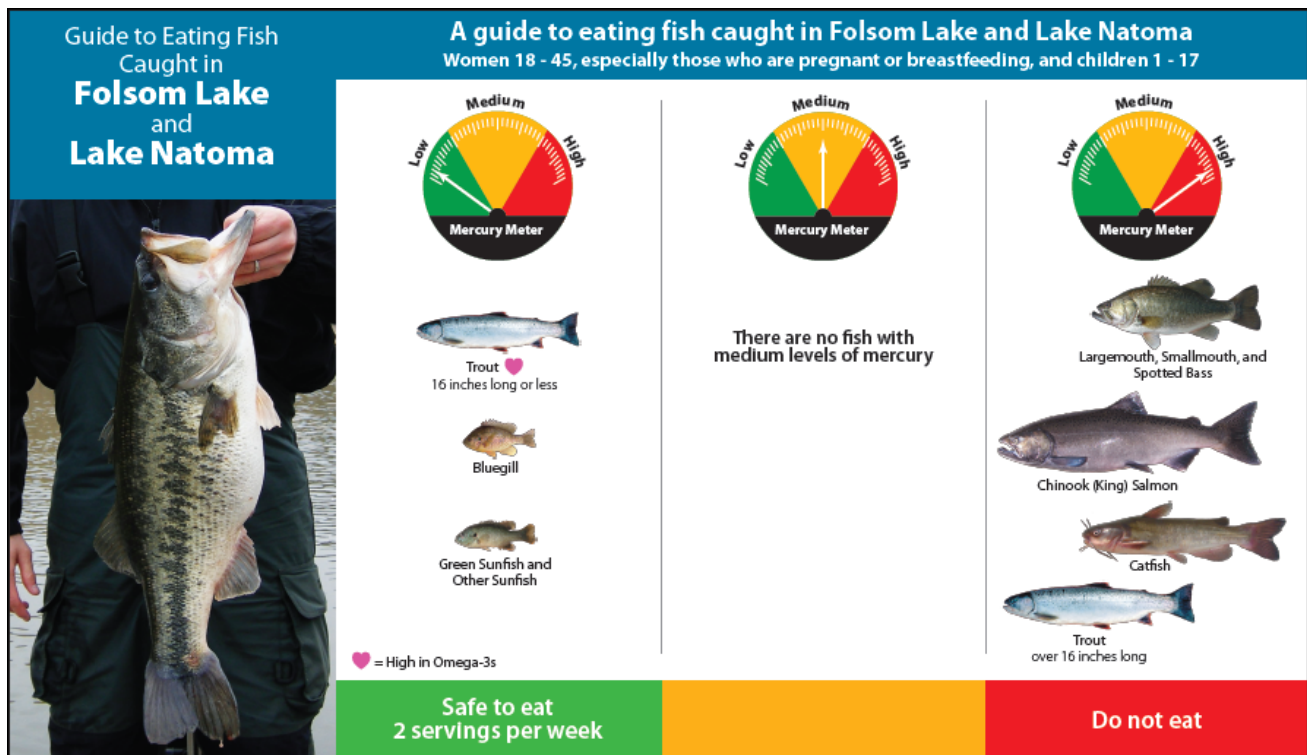
The critical target of methylmercury toxicity is the nervous system, particularly in developing organisms such as the fetus and children. Methylmercury toxicity can occur to the fetus during pregnancy even in the absence of symptoms in the mother. In 1985, the United States Environmental Protection Agency (U.S. EPA) set a reference dose (that is the daily exposure likely to be without significant risks of deleterious effects during a lifetime) for methylmercury of 3×10^{-4} milligrams per kilogram of body weight per day (mg/kg-day), based on central nervous system effects (ataxia, or loss of muscular coordination; and paresthesia, a sensation of numbness and tingling) in adults. This reference dose (RfD) was lowered to 1×10^{-4} mg/kg-day in 1995 (and confirmed in 2001), based on neurodevelopmental abnormalities in infants exposed *in utero*.

OEHHA finds convincing evidence that the fetus is more sensitive than adults to the neurotoxic effects of mercury, but also recognizes that fish play an important role in a healthy diet, particularly when it replaces other, higher fat sources of protein. These potential beneficial effects are thought to stem largely from unique fatty acids found in fish (docosahexaenoic and eicosapentaenoic acids) and include reduced rates of cardiovascular disease and stroke,

decreased inflammation, and improvements in cognitive and visual function. Fish consumption during pregnancy, in particular, has been associated with higher cognitive scores in young children. Nevertheless, because the fetus has increased vulnerability to methylmercury, OEHHA will use the current U.S. EPA RfD, based on effects in the fetus, for women of childbearing age (18-45 years) and children 1-17 years. At the same time, OEHHA will encourage women 18-45 to select and eat fish that are low in mercury or other contaminants and high in the fatty acids described above, which can benefit the developing fetus. The previous U.S. EPA RfD, based on effects in adults, will be used for women over 45 years and men, who are generally less sensitive to methylmercury.

In order to provide fish consumption guidelines for various fish species, contaminant concentrations in fish from a water body are compared to OEHHA ATLs for those chemicals, which are designed to determine the appropriate consumption rate (quantity of fish or shellfish consumed in a given time period) that would prevent exposure to more than the average daily RfD for non-carcinogens or a cancer risk level greater than 1×10^{-4} (one in 10,000) for carcinogens. Best professional judgment is used to determine the most suitable data evaluation approach as well as the most appropriate method to convert a complex data set into more simplified and unified consumption advice for risk communication purposes. Ultimately, a health advisory and safe eating guidelines identify those fish species with high contaminant levels whose consumption should be avoided as well as those low-contaminant fish that may be consumed frequently as part of a healthy diet. A statistically representative sample size was available to provide consumption advice for bluegill, redear sunfish, channel catfish, Chinook salmon, rainbow trout, largemouth bass, and spotted bass. Supporting data (such as mercury concentration for a closely related species at a similar trophic level) were used to develop additional consumption guidelines for green sunfish (and other sunfish), other trout species, white catfish, and smallmouth bass from these two water bodies.

For general advice on how to limit your exposure to chemical contaminants in sport fish (e.g., eating smaller fish of legal size), as well as a fact sheet on methylmercury in sport fish, see the California Sport Fish Consumption Advisories (<http://www.oehha.ca.gov/fish.html>) and Appendices 1 and 2. Guidelines for other California water bodies can be found online at: http://www.oehha.ca.gov/fish/so_cal/index.html. It should be noted that, unlike the case for many chlorinated hydrocarbon contaminants, such as DDTs and PCBs, various cooking and cleaning techniques will not reduce the methylmercury content of fish. Additionally, there are no known ways to prepare fish (such as soaking in milk) that will reduce the methylmercury content of the fish.




Men over 17 and women over 45 can safely eat more fish

- Safe to eat 5 servings per week**
- There are no fish with medium levels of mercury
- Safe to eat 1 serving per week** except catfish from Lake Natoma — **DO NOT EAT**


Why eat fish?
Eating fish is good for your health. Fish have Omega-3s that can reduce your risk for heart disease and improve how the brain develops in unborn babies and children.

What is the concern?
Some fish have high levels of mercury that can negatively affect how the brain develops in unborn babies and children.

What is a serving?



For Adults




For Children

The recommended serving of fish is about the size and thickness of your hand. Give children smaller servings.

Fish buying guidelines for women 18 – 45 and children 1 – 17

Do not eat fish caught by family and friends in the same week that you eat fish bought in a store or restaurant. For fish that you buy:

- Safe to eat 2 servings per week** of low mercury fish such as salmon ♡, pollock, catfish, tilapia, shrimp, anchovies ♡, sardines ♡, trout ♡, and canned chunk-light tuna
- OR**
- Safe to eat 1 serving per week** of medium-mercury fish such as canned albacore (white) tuna ♡
- Do not eat** shark, swordfish, tilefish, or king mackerel



California Office of Environmental Health Hazard Assessment
www.oehha.ca.gov/fish.html
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